

# Naval Helicopter Association



## Symposium 2002

April 8 - 11

**RDML Steve Turcotte, USN**  
**Commander, Naval Safety Center**





# NHA Symposium 2002



## Where Are We?



*In the last five years  
(FY97-02), mishaps cost  
the Navy \$4 BILLION and  
1,080 LIVES!*

**175 Sailors and Marines died in  
FY01**

**109 Sailors and Marines died  
this fiscal year\***

**Indirect costs?**

**FY02: 29 March**



# Cost and Deaths

USN/USMC, FY97-02

## Cost In Millions

Aviation  
**\$3.243B**

Recreation  
on

**\$62M**  
PMV

**\$134M**

Afloat  
**\$384M**

Shore/Ground/  
OpMV  
**\$144M**

**Total: \$4B**

## Deaths

Traffic  
**626**

Afloat  
**19**

Shore/  
Ground/OpM  
V  
**134**

Aviation  
**157**

Recreation  
**144**

**Total Deaths:  
1,080**

FY02: 29 March



# Mishap Costs



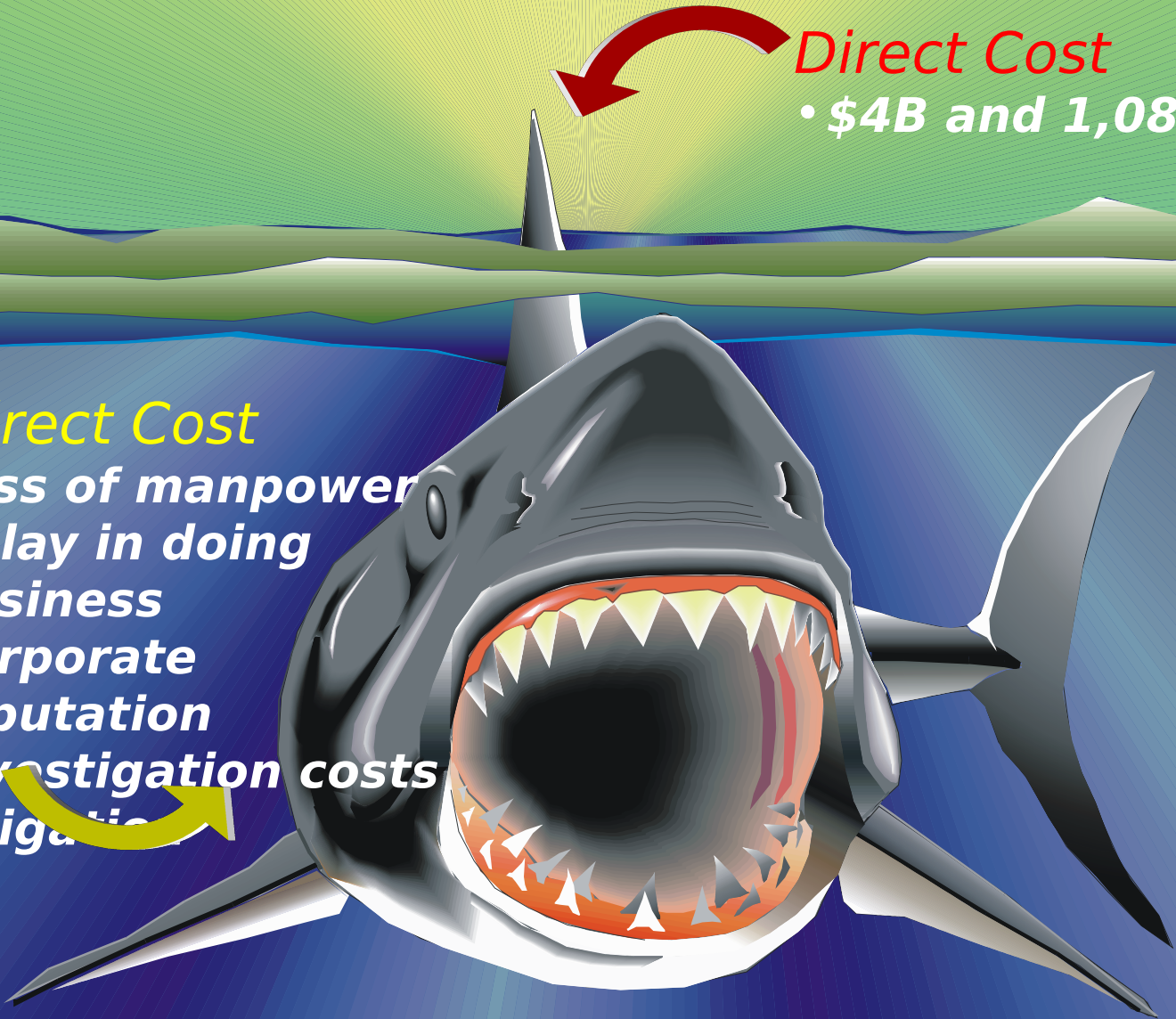
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## Direct Cost

• \$4B and 1,080 lives

## Indirect Cost

- Loss of manpower
- Delay in doing business
- Corporate reputation
- Investigation costs
- Litigation costs

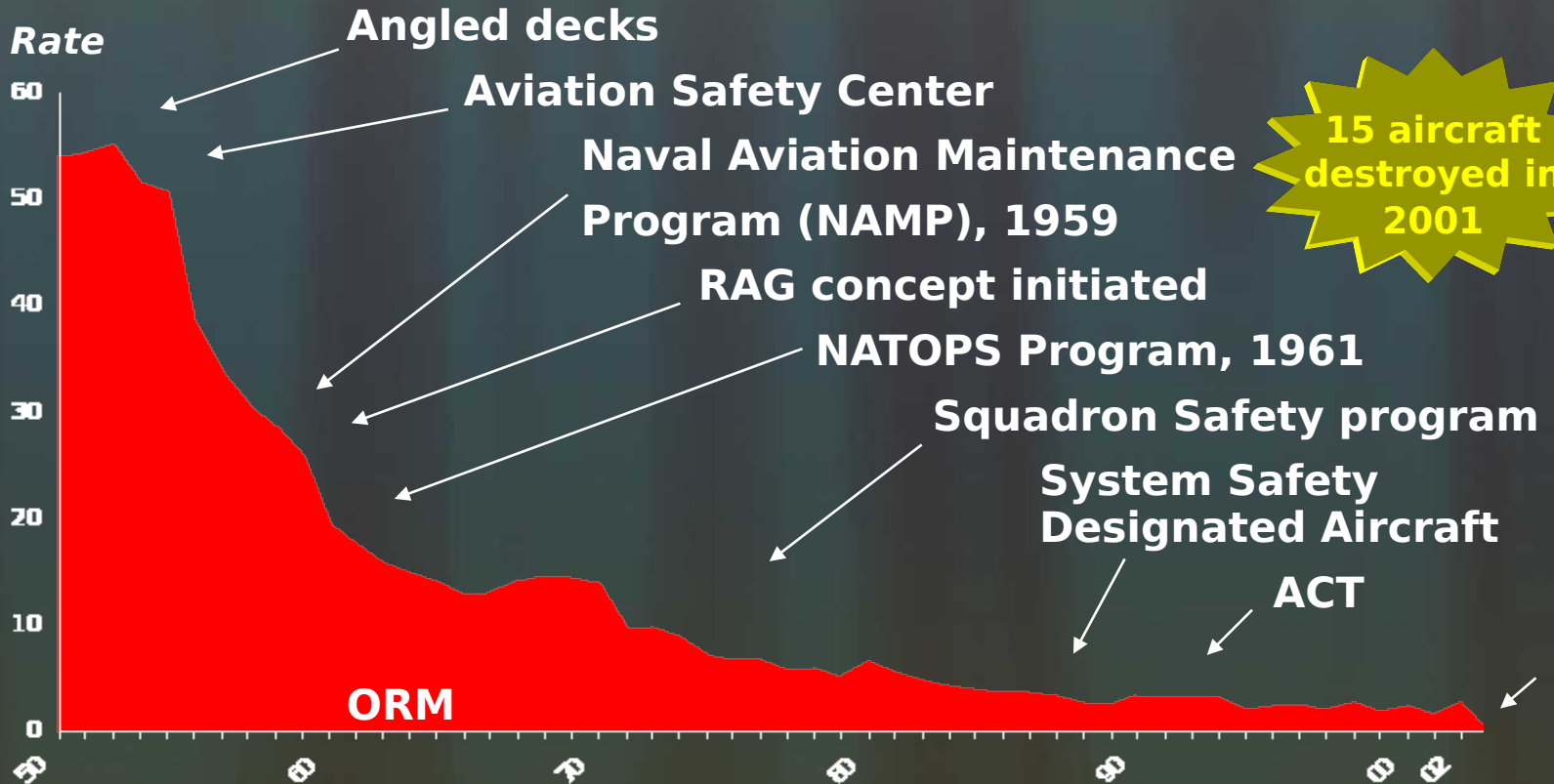


# Naval Aviation Mishap Rates

## FY50-02

776 aircraft  
destroyed in  
1954

**FY01**    **FY02 (29  
March)**  
**1.21**    **2.36**



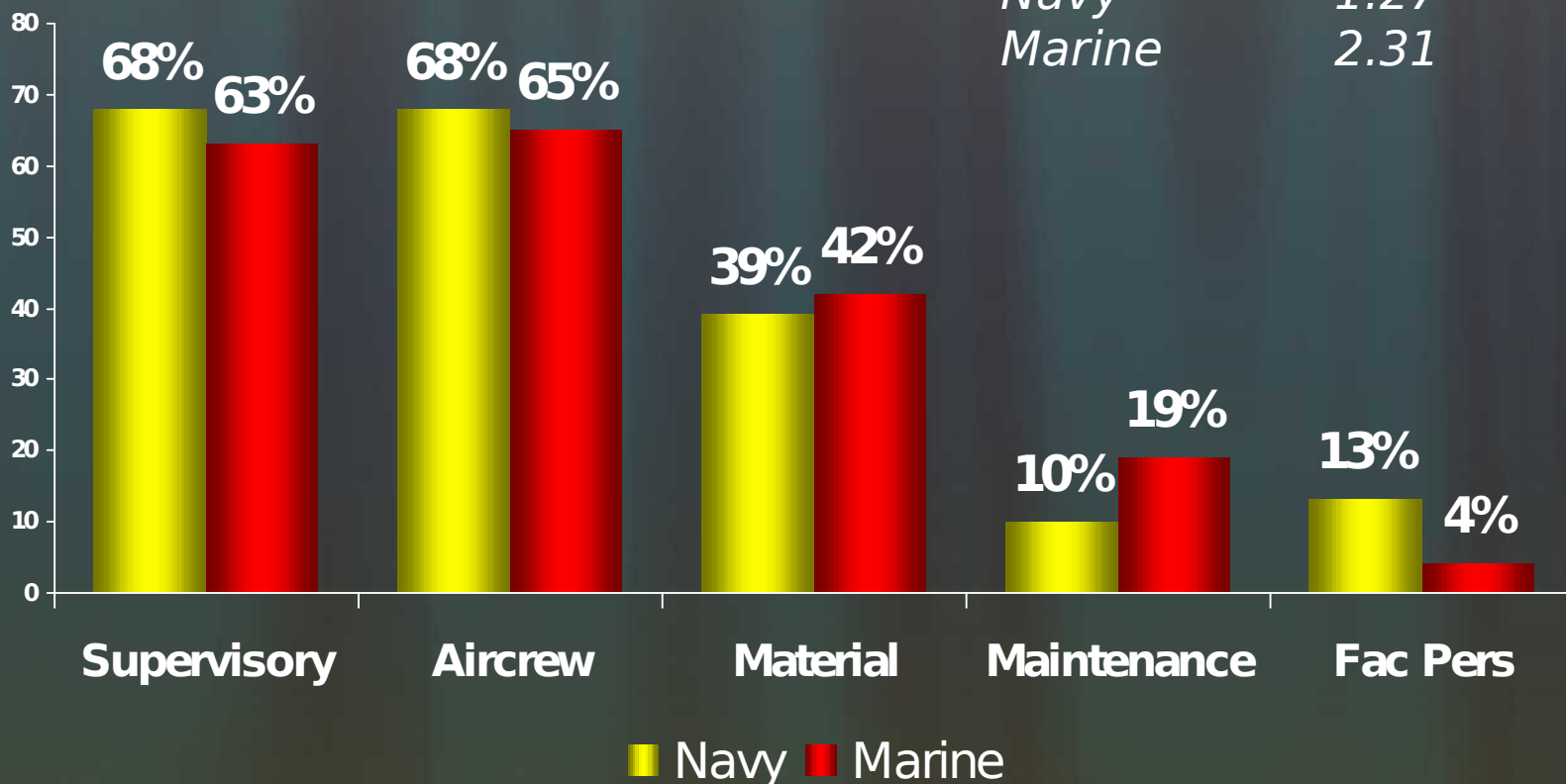
# Cause Factors of Aviation Mishaps

USN/USMC Class-A Flight Mishaps  
FY97 -01

*Human Error Rates*

USN/USMC	1.52
Navy	1.27
Marine	2.31

Percent



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1002C

Naval Safety Center Norfolk, VA



# Human Error

## FY97-02

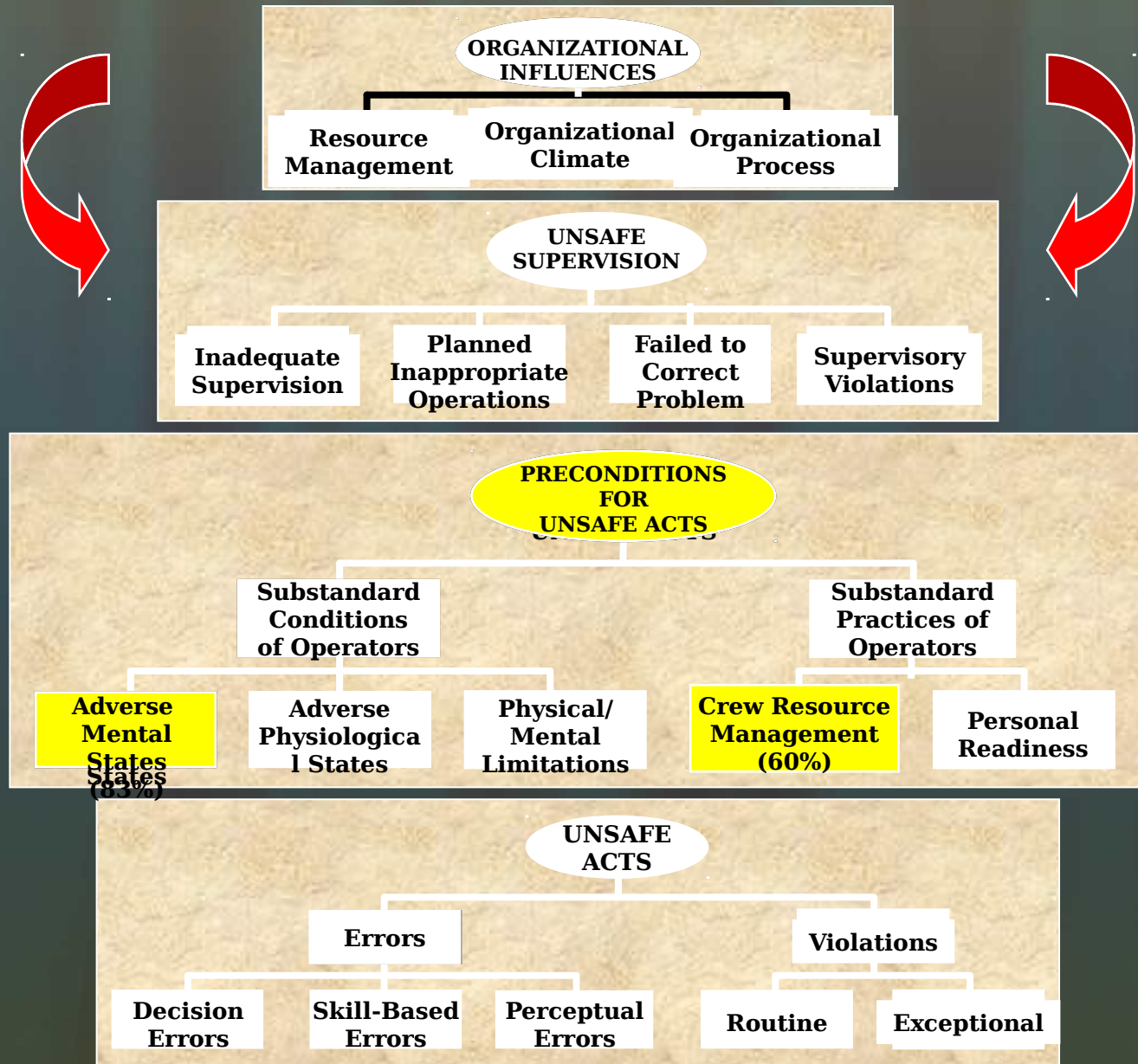
No. of Class-A Mishaps		Human Error	
Navy/Marine Aviation*	139 of 171	HE 81%	Non-HE 19%
*FY97-01 F/FR/AGM			
Navy Afloat	41 of 50	HE 82%	Non-HE 18%
Navy Operational Shore	36 of 48	HE 75%	Non-HE 25%
Navy PMV	295 of 350	HE 84%	Non-HE 16%

FY02: 29 March

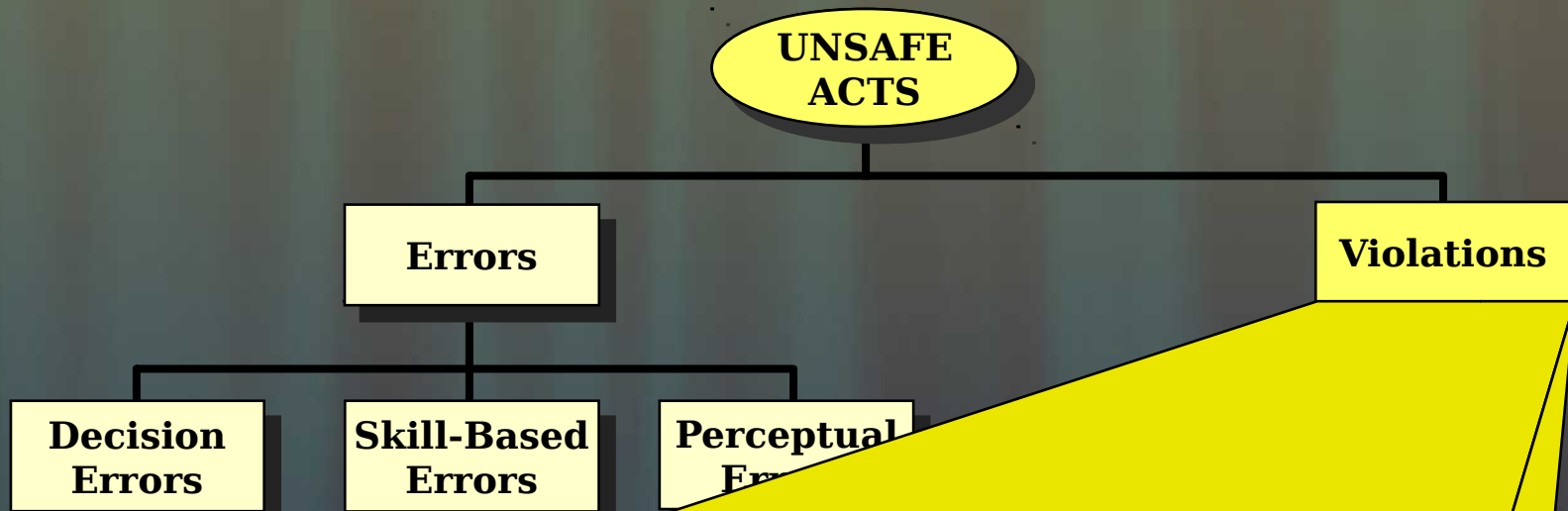




# HFACS Model







## VIOLATIONS

- ✱52) Violation of NATOPS/Regs SOP
- (7) Failed to adhere to brief
- (5) Not current/qualified for mission
- (5) Improper procedure
- (5) Accepted unnecessary risk
- (2) Briefed unauthorized mission



# ***Skill-Based Error Breakout:***

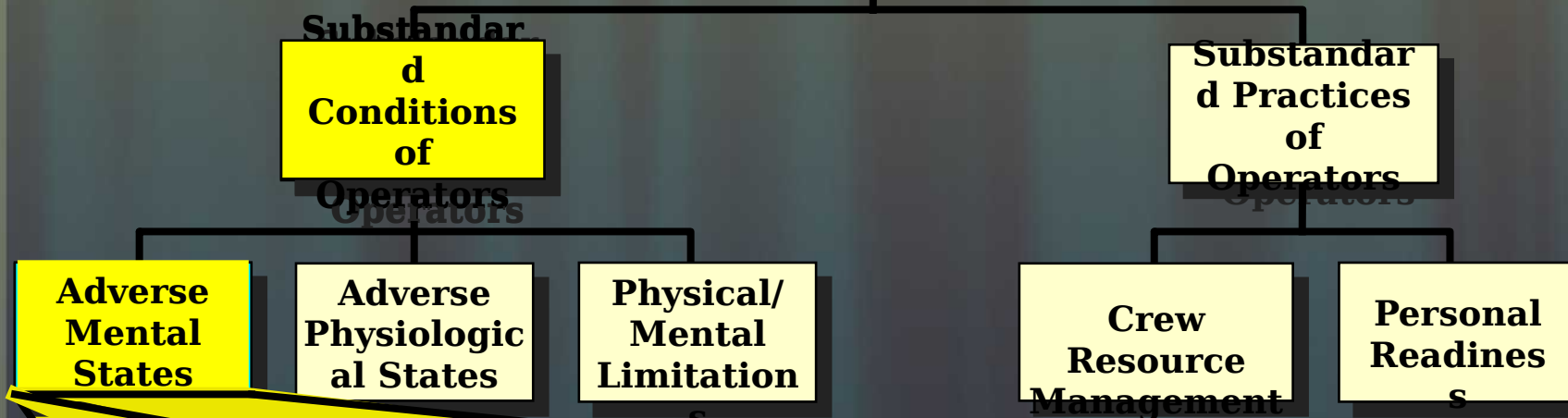
## ***USN/USMC TACAIR & HELO***

### ***Class-A Aircrew Error Flight Mishaps***

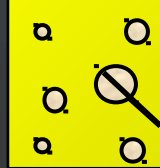
- **(56)** Breakdown in visual/instrument scan
- **(11)** Poor technique
- **(11)** Failed to see and avoid
- **(10)** Failed to prioritize attention
- **(9)** Improper use of flight controls
- **(8)** Failed to recognize extremis
- **(8)** Inadvertent use of flight controls
- **(8)** Omitted checklist item
- **(8)** Delayed response
- **(6)** Improper instrument cross check
- **(5)** Poor habit pattern



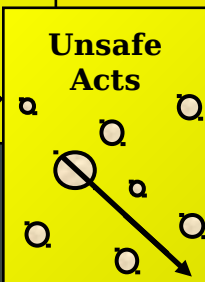
# PRECONDITIONS FOR UNSAFE ACTS



## Preconditions for Unsafe Acts



## Unsafe Acts



## ADVERSE MENTAL STATE

- (57) Channelized attention
- (32) Loss of SA
- (26) Inattention/Distracted
- (17) Task saturation
- (19) Overconfidence
- (14) Fatigue
- (8) Complacency
- (5) Lack of confidence
- (5) Stress/Perceived stress



# PRECONDITIONS FOR UNSAFE ACTS



Preconditions  
for  
Unsafe Acts

Unsafe  
Acts

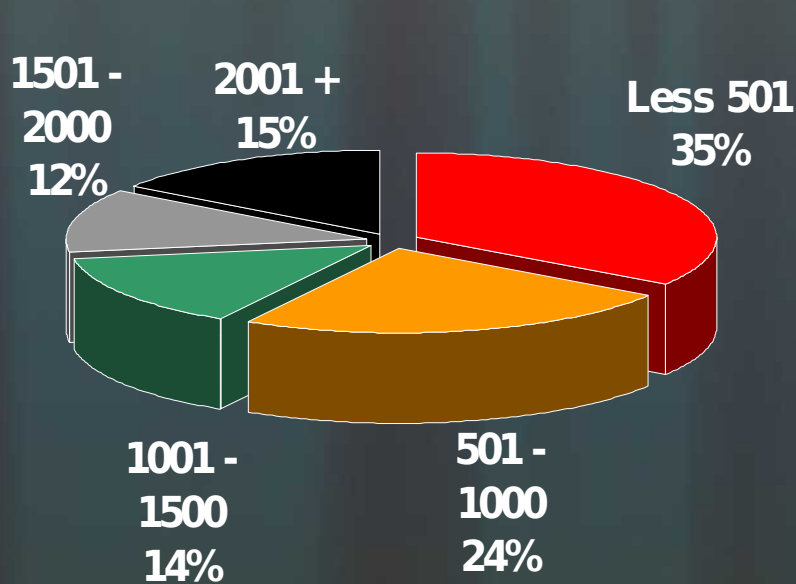
## CRM

- (75) Failed to Communicate/Coordinate
- (47) Failed to Backup
- (29) Failed to Conduct Adequate Brief
- (14) Failed to exercise leadership
- (6) Failed to use all available resources
- (5) Transcockpit authority gradient
- (5) Failed to adequately plan/prepare for flight
- (3) Used non-standard terminology

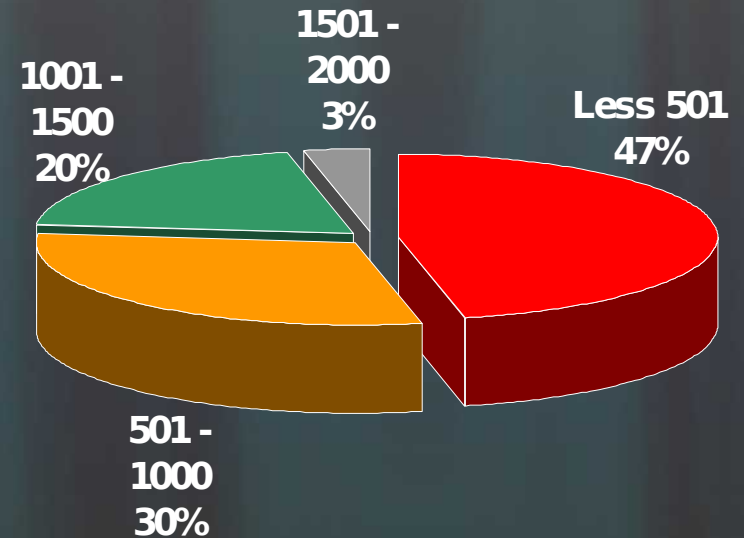




## *Helo In-Model Flight Hour Distribution vs Helo Skill-Based Errors (FY91-01)*



**HELO Pilot  
Flight Hour Distribution**



**% Skill-Based  
Error Mishaps  
(n-30)**



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# ***Why are We Seeing an Increase in Skill-Based Errors?***

- Lack of flight time?
- Quality of flight time?
- Decreasing experience
- OpsTempo?
- Perstempo?
- Shortcoming in our training program?
- Shortcoming in our operational practices?
- Would increased simulator-flight time be an effective intervention?



# Intervention Strategies

- **Increase the proficiency of the low time-in-model (< 500 hour) aviators**
  - use simulator time to augment flight time to achieve earlier proficiency
- **Emphasize development of psychomotor skills**
  - use simulator time to augment flight time and the development of a proper scan and stick and rudder skills
- **Emphasize avoidance of preconditions**
  - use simulator time to augment flight time and development of automated basic flight skills that enable an aviator to avoid channelized attention/task saturation and improve CRM skills

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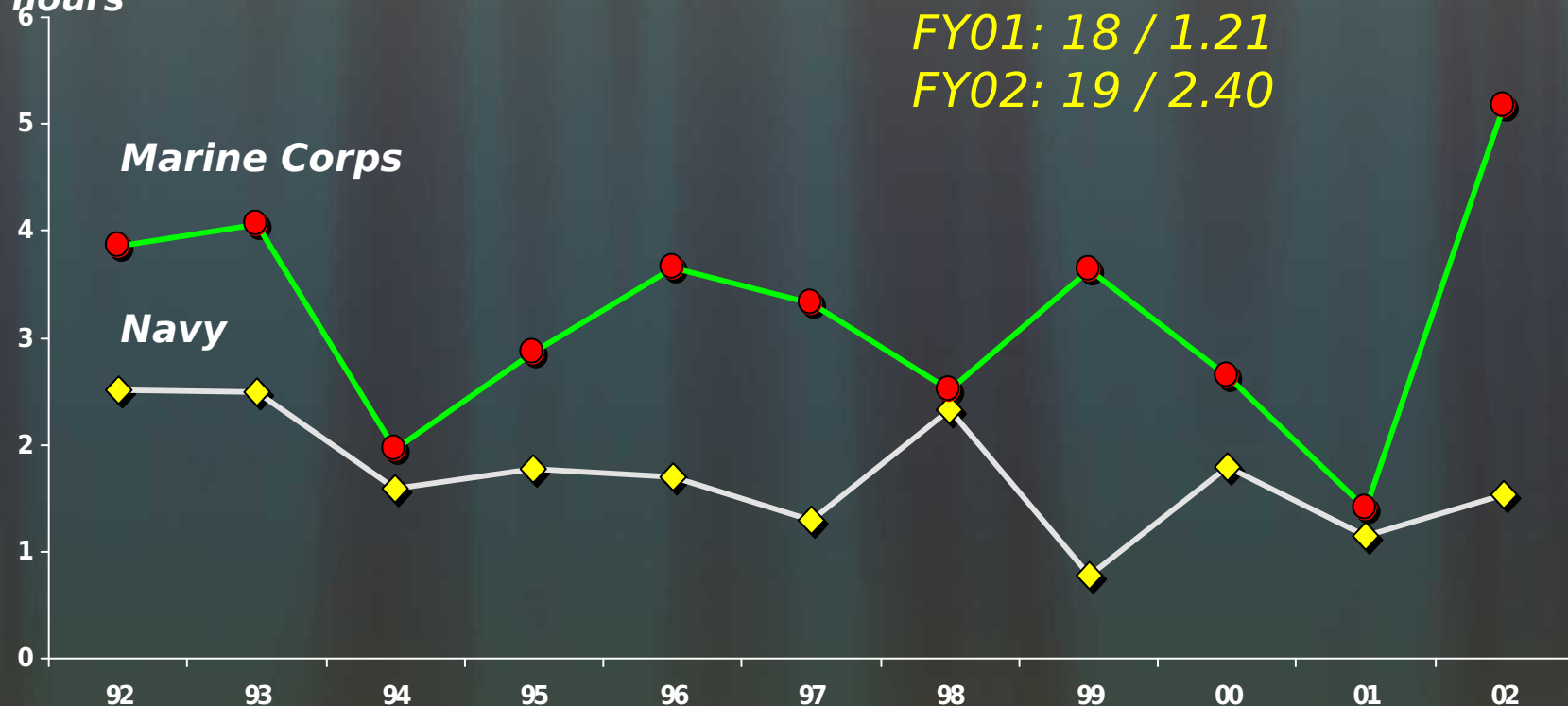


# Class-A Flight Mishap Rates

## USN/USMC, FY92-02

Mishap rates per 100,000 flight hours

Navy/Marine  
FY00: 29 / 1.99  
FY01: 18 / 1.21  
FY02: 19 / 2.40



FY02: 29 March

Naval Safety Center Norfolk, VA



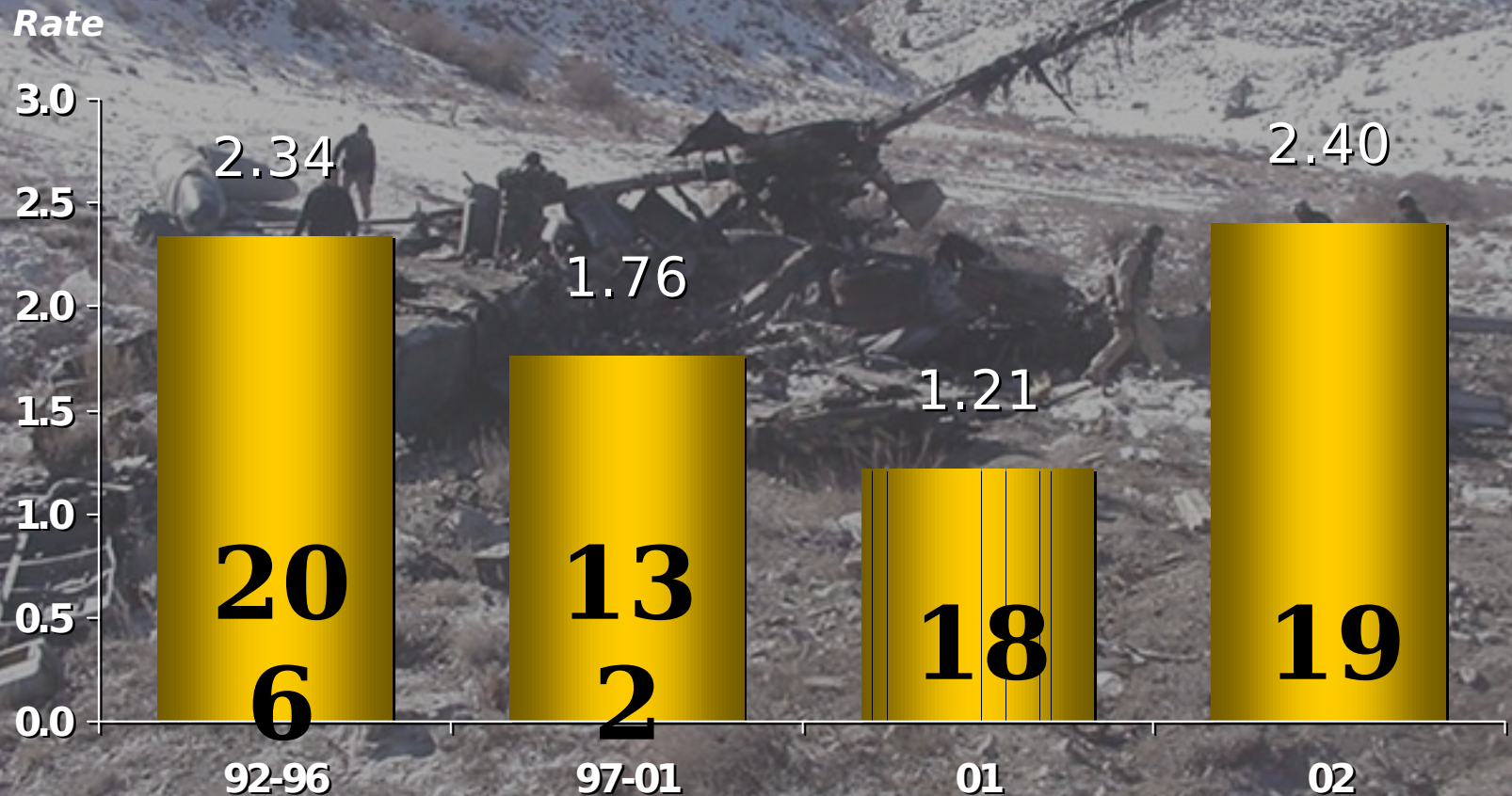




# ***Class-A Flight Mishaps***

***USN/USMC, FY92-02***

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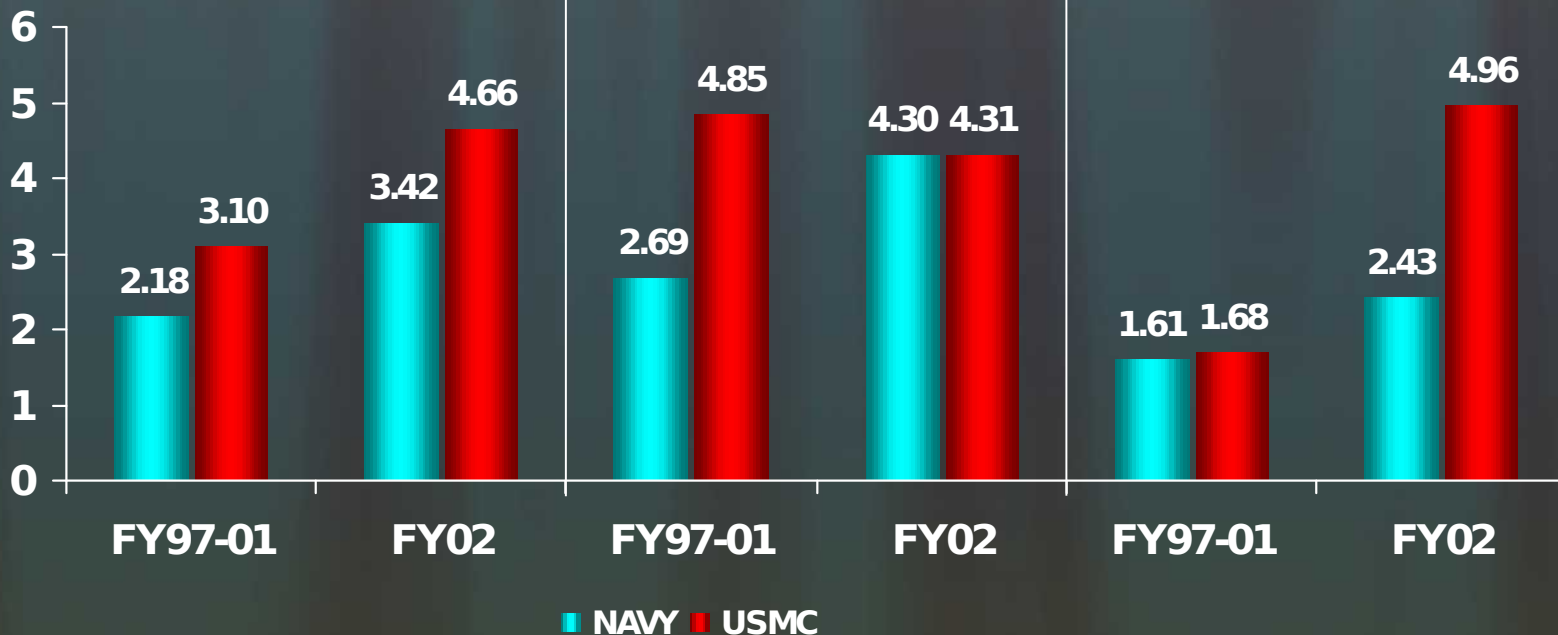


# Tactical Aircraft Comparison

## USN/USMC, FY97-02

### Combined Helicopter

### Fighter-Attack



**FY02 (29 March): Fighter-Attack + Helo + V-22**

**Navy: 7/1.31**

**Air Force:**

Naval Safety Center 141M3 Norfolk, VA

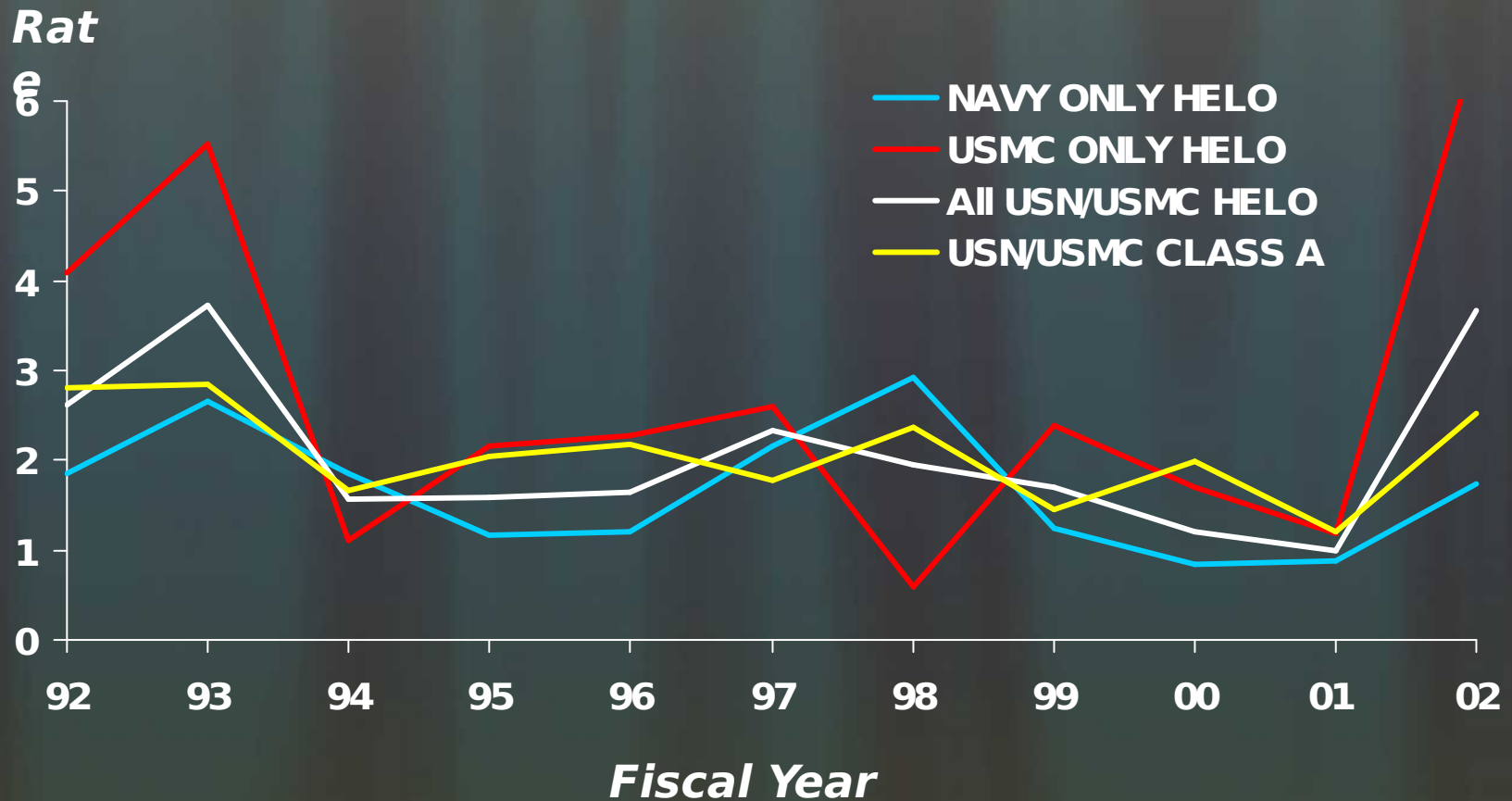




# *Helo Class-A Flight Mishaps*

*USN/USMC, FY92-02*

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**FY02: 29 March**

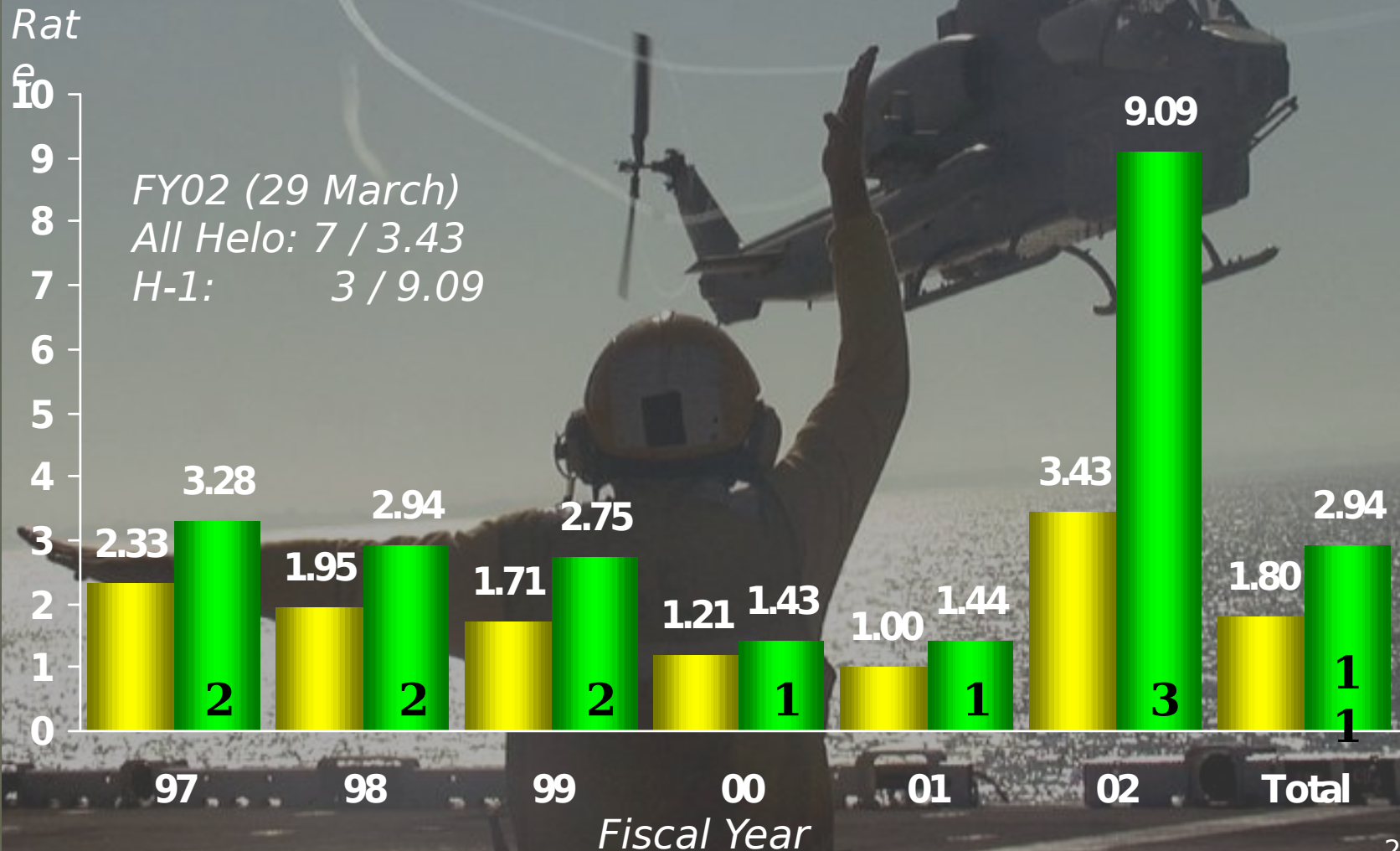




# USN/USMC Helicopters vs. H-1

## Class-A Flight Mishaps, FY97-02

■ ALL HELO ■ H-1



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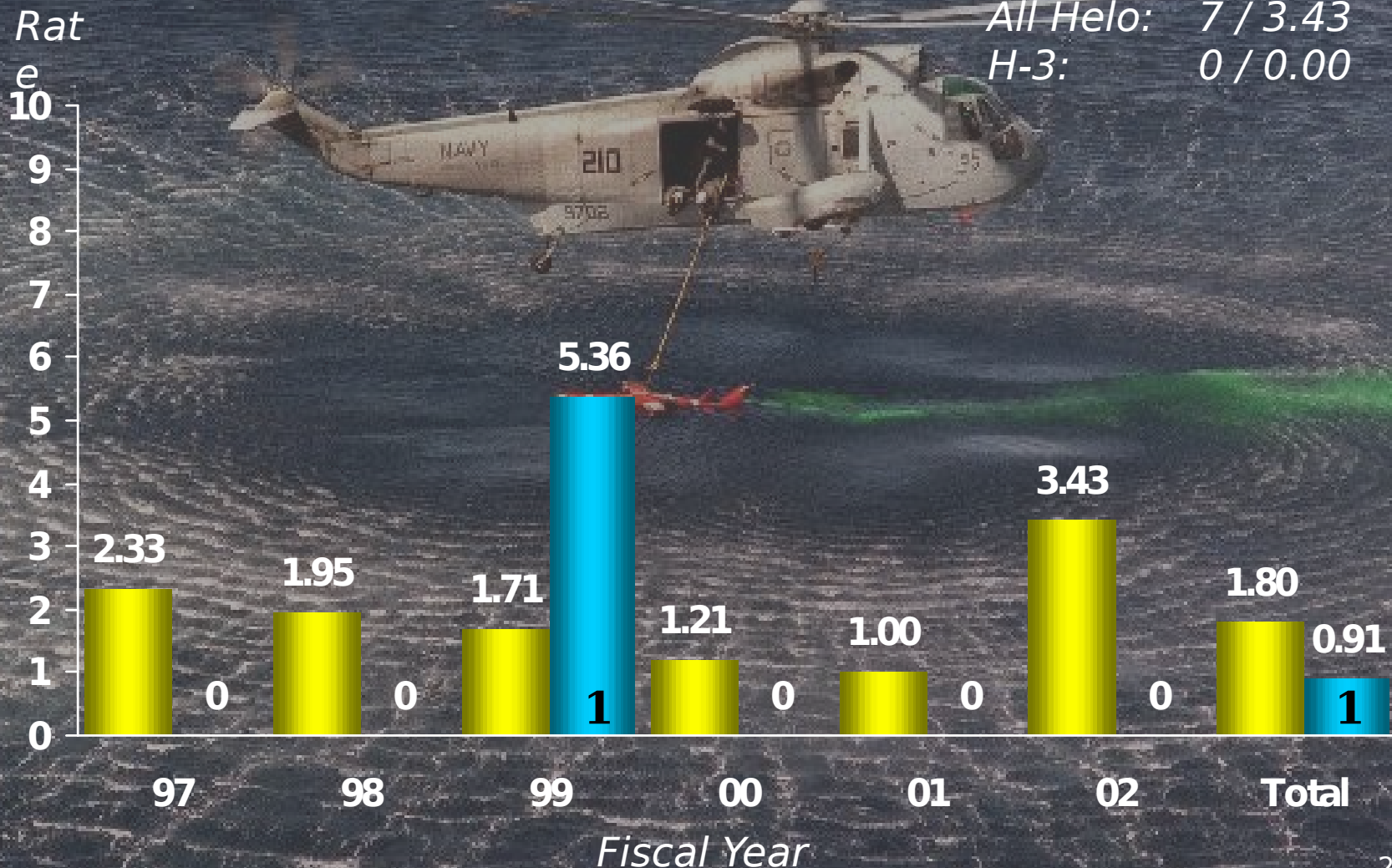


# USN/USMC Helicopters vs. H-3

## Class-A Flight Mishaps, FY97-02

■ **ALL HELO** ■ **H-3**

FY02 (29 March)  
All Helo: 7 / 3.43  
H-3: 0 / 0.00



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# USN/USMC Helicopters vs. H-46

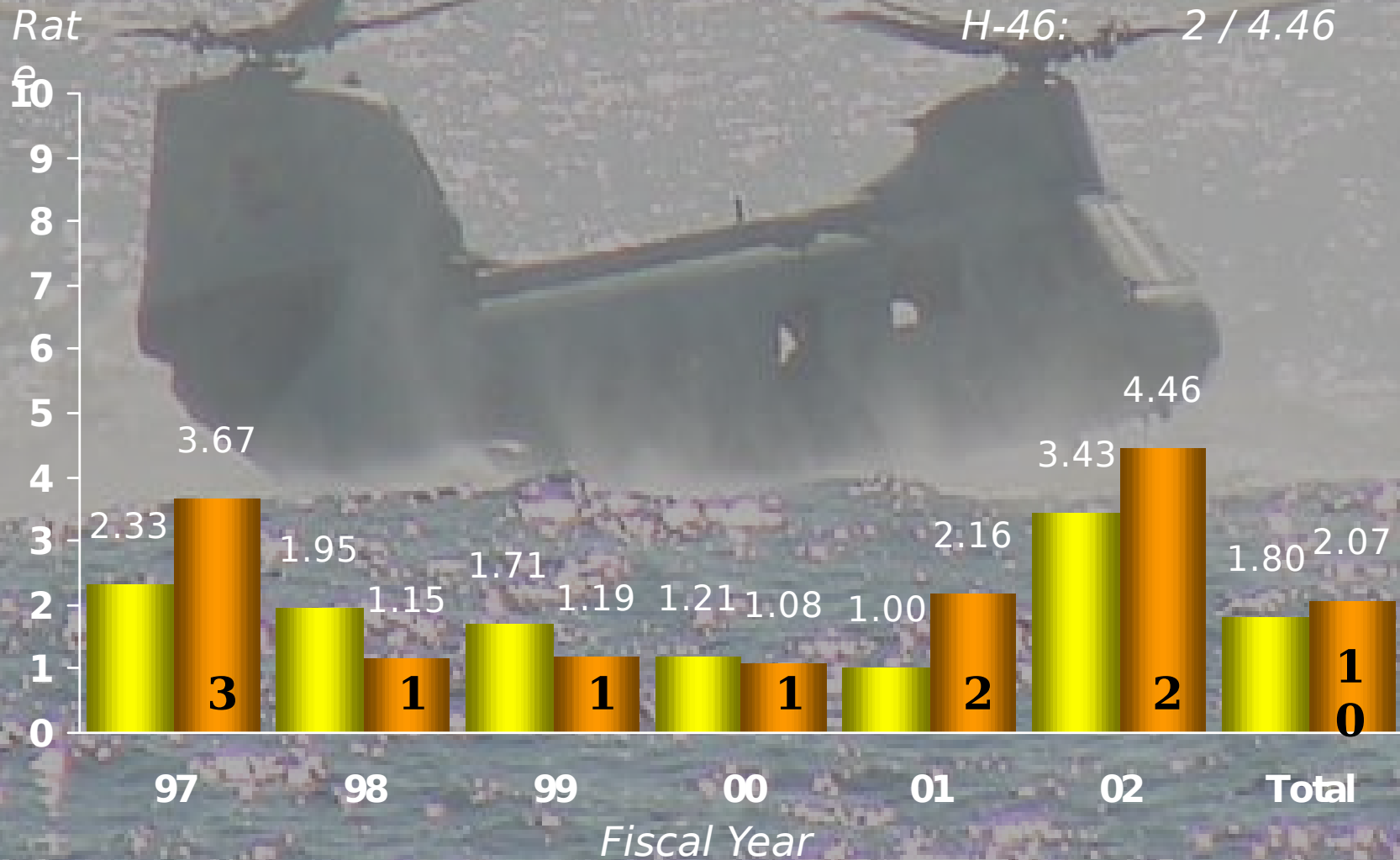
## Class-A Flight Mishaps, FY97-02

FY02 (29 March)

All Helo: 7 / 3.43

H-46: 2 / 4.46

■ **ALL HELO** ■ **H-46**



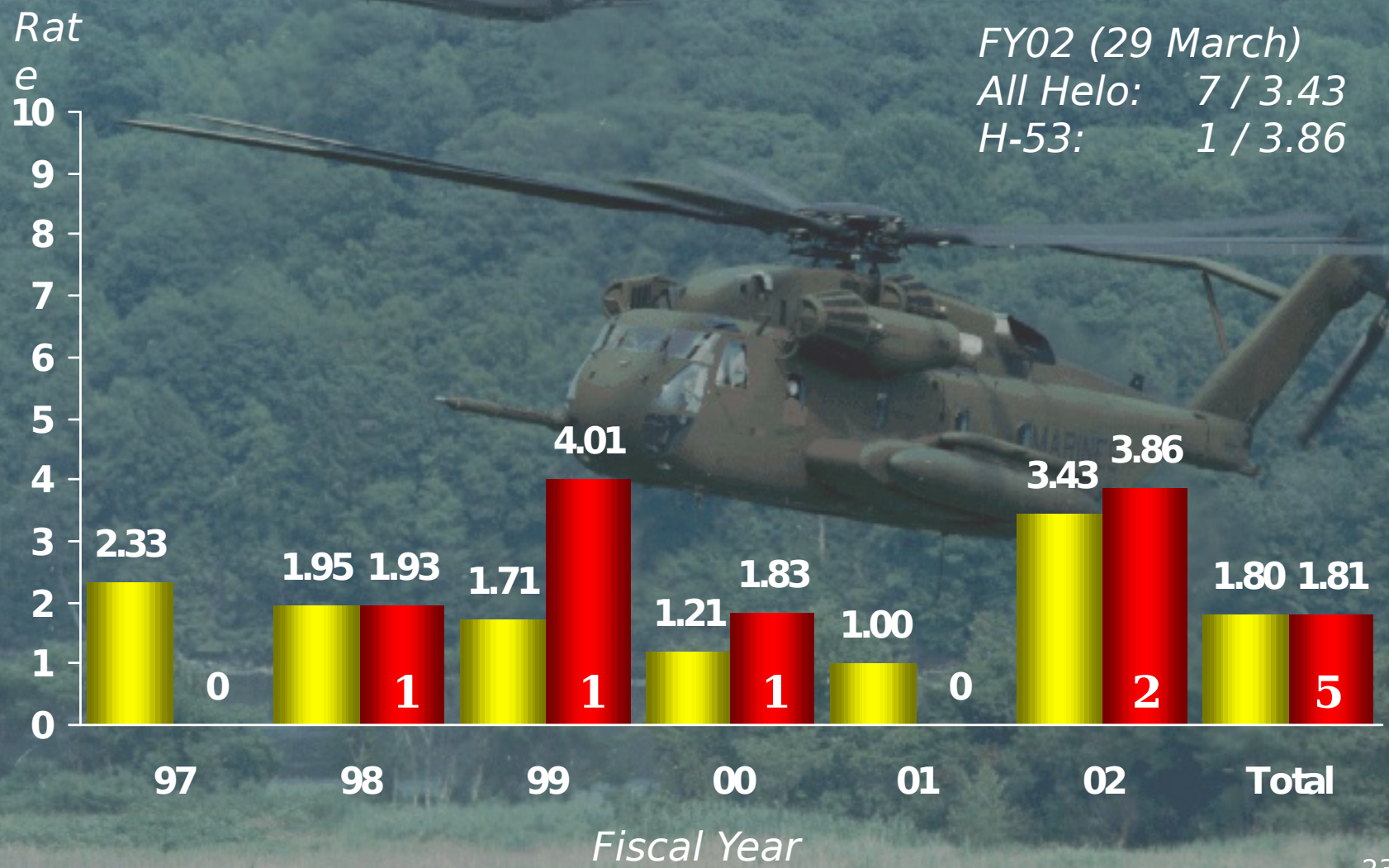
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# USN/USMC Helicopters Vs. H-53

Class-A Flight Mishaps, FY97-02

■ ALL HELO ■ H-53



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# USN/USMC Helicopters Vs. H-60

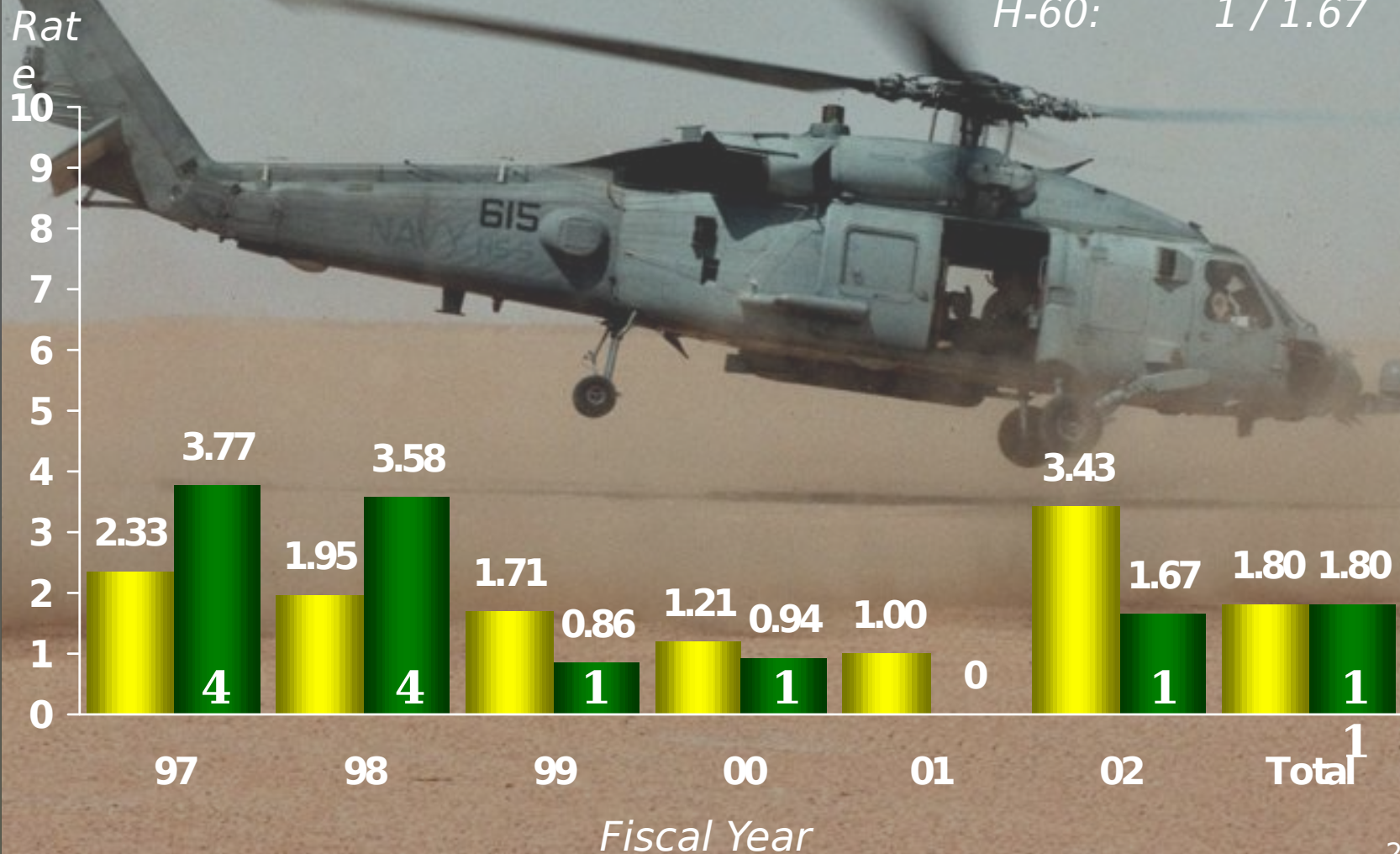
Class-A Flight Mishaps, FY97-02

■ ALL HELO ■ H-60

FY02 (29 March)

All Helo: 7 / 3.43

H-60: 1 / 1.67



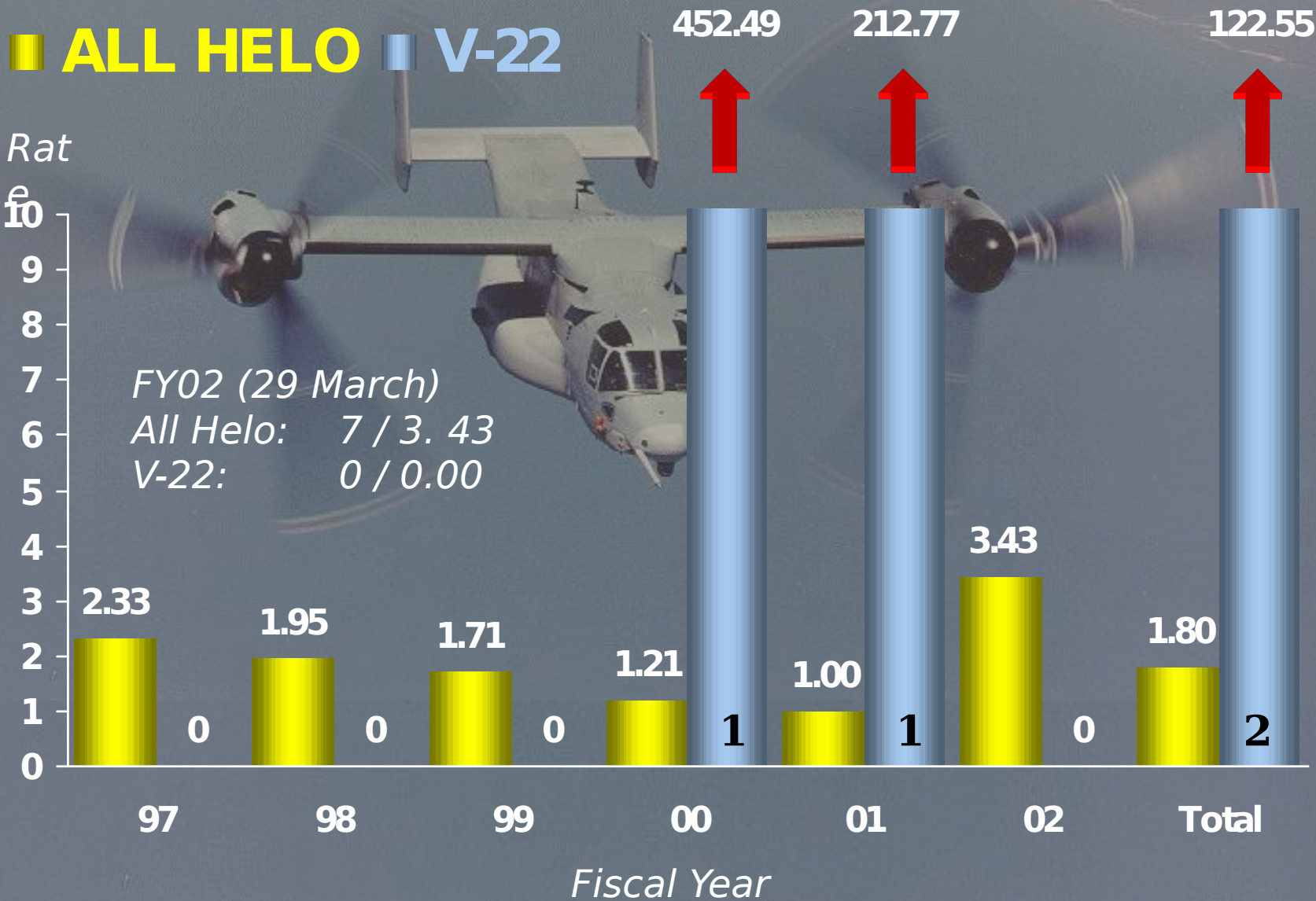
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# USN/USMC Helicopters vs. V-22

Class-A Flight Mishaps, FY97-02



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# Aviation

## TRENDS

### Mishap

### Investigations

- *Human error (aircrew):*

Leading causal factor

- Skill-based errors
- CRM failures
- Violations

- Surveys

- *Manning/inexperience*

- Training

quality/quantity

- NATOPS/technical pubs

- Cannibalization rates

up

## TAKEAWAYS

- *Fund state-of-art simulators and data centric systems*
- Improve training
- Increase proficiency
- Institutionalize ORM
- Enforce standards
- Increase checks and balances





# Cost and Deaths

USN/USMC, FY97-02

## Cost In Millions

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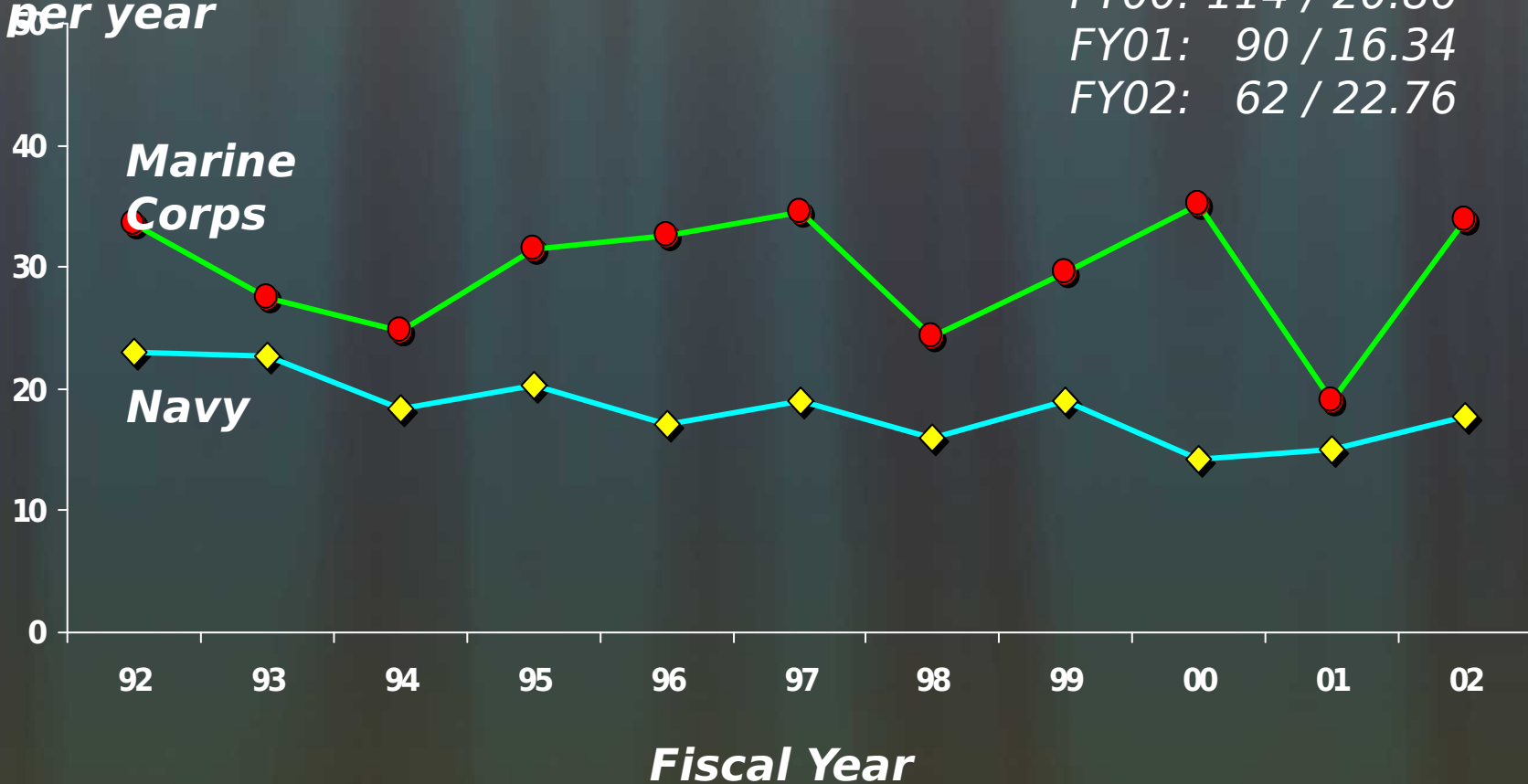
# PMV Fatality Rates

## USN/USMC, FY92-02

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Mishap rates per 100,000 personnel  
per year

Navy/Marine  
FY00: 114 / 20.86  
FY01: 90 / 16.34  
FY02: 62 / 22.76



FY02: 29 March







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## PMV Fatalities by Community USN/USMC, FY97-02

Total: 350 Sailors  
276 Marines

Shore	Afloat	USMC
186	135	Aviation
		64

Navy	USMC
Aviation	Ground
29	212

FY02: 29 March



# Factors in Traffic Deaths

## USN/USMC, FY99-02

**FY99-01 Deaths:**

**326**

FY99: 122

FY00: 114

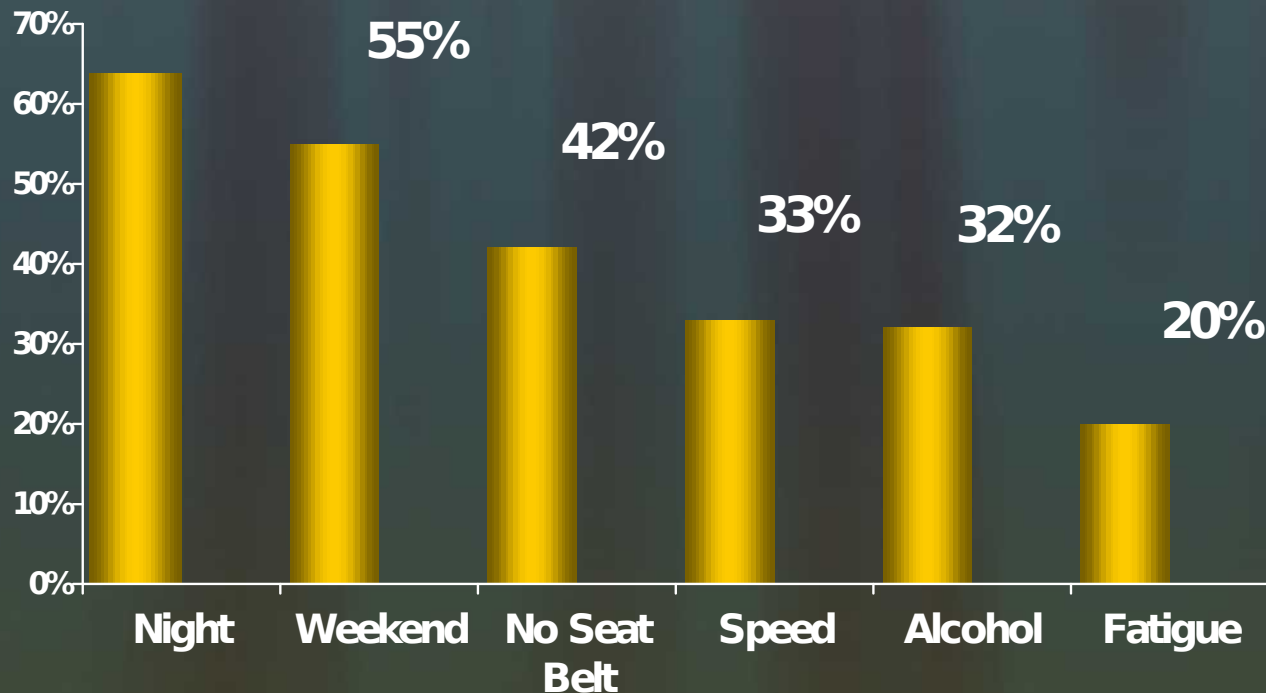
FY01: 90

**64%**

**FY02**

**Deaths: 62**

As of 29 March



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# Leadership Commitment

## Traffic Safety

**Risk  
Management**

**Enforcement**

**Education**

**Training**

## Leadership Commitment

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There are no memorials  
to honor service members  
who died in car accidents.





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# Questions?

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[www.safetycenter.navy.mil](http://www.safetycenter.navy.mil)***